

Endocrine Disruptors as a SAICM Emerging Issue: IPEN Position

Background

An endocrine disruptor is a chemical, or mixture of chemicals, that interferes with hormone signaling. Hormones enable cells in one part of an organism to communicate with cells in other parts of the organism. Interference with these signals has both direct and indirect consequences for the health of humans and wildlife, including the increased susceptibility to certain diseases. The adverse effects that have been linked with exposure to chemical(s) with endocrine disrupting properties include:

- Reproductive effects, such as reduced semen quality and quantity, infertility due to endometriosis, ovarian failure, and polycystic ovarian syndrome;
- Neurological effects, affecting cognition, behavior, stress, growth, lactation, metabolism and energy balance;
- Cardiovascular effects;
- Diabetes and obesity;
- Deformities, including reproductive tract abnormalities;
- Cancers, such as breast, mammary, testicular and prostate cancers; and
- Immune system effects.

The timing of exposure is critical. One of the most tragic aspects of EDCs is the vulnerability of young children, particularly unborn and newborn infants. During highly sensitive periods of development, the young are highly susceptible to endocrine disruptors in the environment, including exposure while inside a mother's womb; through food, including breast milk; from drinking water contaminated with pharmaceutical and/or other chemical pollutants; and through the indoor environment—even toys. The consequences of exposure during development may not be apparent until adulthood or later in life, and may affect not just the exposed individual but also their children and subsequent generations.

Unlike some toxic chemicals that follow a linear relationship between dose and response, the body's response to various doses of EDCs is often non-linear. Both U-shaped and inverted U-shaped dose-response curves may be observed for EDCs. In other words, low doses may exert stronger effect than higher doses. This concept has been known for neurotransmitter actions, but only in the past decade have they begun to be more widely appreciated for EDCs.

Even infinitesimally low-levels of exposure to EDCs may cause adverse effects. Developing babies and children are likely to be exposed to not just one hazardous chemical, but a mixture of actual and suspected EDCs and other toxicants. The combined effect of exposure to many EDCs may be additive (or

perhaps even synergistic), such that exposure to various chemicals at dose levels which by themselves are not predicted to cause adverse effects, together the cumulative exposure may result in adverse effects. This “cocktail effect” of chemical mixtures in our bodies can therefore further magnify the effects of exposure to EDCs at low doses.

Priorities for Cooperative Action on EDCs as an Emerging Policy Issue

In 2006, endocrine disruptors were been identified in the core documents of SAICM as a group of chemicals that might be prioritized under SAICM.¹ Risk Reduction, a SAICM objective, requires that “humans and ecosystems and their constituent parts that are especially vulnerable or especially subject to exposure to chemicals that may pose a risk are taken into account and protected in making decisions on chemicals.”² One of the functions of the International Conference on Chemicals Management is “to focus attention and call for appropriate action on emerging policy issues as they arise and to forge consensus on priorities for cooperative action.”³ The nomination of EDCs as an emerging policy issue under SAICM presents an opportunity for necessary action on endocrine disruptors. IPEN fully supports the nomination of EDCs as an emerging policy issue under SAICM in order to focus attention and call for appropriate action on EDCs.

Additional Resources

Diamanti-Kandarakis *et al.* *Endocrine Disrupting Chemicals: An Endocrine Society Scientific Statement* (2009), available at: http://www.endo-society.org/journals/scientificstatements/upload/edc_scientific_statement.pdf

IPCS, *Global assessment of the state-of-the-science of endocrine disruptors*; WHO/PCS/EDC/02.2 (2002), available at: http://www.who.int/ipcs/publications/new_issues/endocrine_disruptors/en/

Kortenkamp, *State of the Art Assessment of Endocrine Disruptors* (2nd interim report, 2011), available at: http://ec.europa.eu/environment/endocrine/documents/summary_state_science.pdf

¹ See e.g. paragraph 14(d)(ii) of the Overarching Policy Strategy and paragraph 9 of the Global Plan of Action of the Strategic Approach to International Chemicals Management (hereinafter SAICM), available at: http://www.saicm.org/documents/saicm%20texts/SAICM_publication_ENG.pdf

² See e.g. paragraph 14(b) of the Global Plan of Action of SAICM.

³ Paragraph 24 of the Overarching Policy Strategy of the Strategic Approach to International Chemicals Management, available at: http://www.saicm.org/documents/saicm%20texts/SAICM_publication_ENG.pdf